King County
Department of Permitting and Environmental Review
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2015 Washington State Energy Code / IECC

2015

Unincorporated King County RESIDENTIAL CONSTRUCTION ENERGY COMPLIANCE FORM

Interactive form available at www.kingcounty.gov/property/permits/publications.aspx

Applicant's name _____ K.C. tracking no. _____

select applicable item from options given or fill in blank New Conditioned sq. ft.= _____

Job type: New Building ☐ Addition ☐ Remodel ☐
Occupancy: Single Family ☐ Accessory Bldg ☐ Duplex ☐ Total number of bedrooms in building: _____
Heating fuel: Gas / Oil ☐ Electric ☐ Propane ☐ Other: _____
Heating system: Forced Air ☐ Room Heaters ☐ Radiant ☐ Hydronic ☐

Boiler ☐ Heat Pump ☐ Ductless Heat Pump ☐ Existing System ☐ Other: ☐ _____

Location of Heating Equipment _____ Size (pg.5) _____ Btuh / KW

choose option of compliance: **< PLANS MUST REFLECT ALL OPTIONS CHOSEN >**

☐ Prescriptive compliance: Zone 4 Marine (wood-framed buildings) R402.1.2

	Openings[a] U-Values		Ceiling Insulation		Walls[a]	Below Grade Walls[c]			
	% floor area	Vertical	Overhead	attic	vaulted[b]	Above Grade	interior	exterior	Floors	Slab on grade
NOTE: Energy credit (EC) options may affect element values	Unlimited	0.30 *EC 1d: 0.24*	0.50	R-49 or R-38 ADV	R-38	R-21 Int.	R-21 Int.w/ thermal break	R-10	R-30	R-10
	EC option 1a	*0.28*	*0.50*	*""*	*""*	*""*	*""*	*""*	*R-38*	*R-10 Full*
	EC option 1b	*0.25*	*0.50*	*""*	*""*	*R21+R4ci*	*R21+R5ci*	*""*	*R-38*	*R-10 Full*
	EC option 1c	*0.22*	*0.50*	*R-49 ADV*	*R-49*	*R21+R12ci*	*R21+R12ci*	*""*	*R-38*	*R-10 Full*

footnote a *openings includes all windows and doors. Intermediate framing requires headers to be insulated.*
footnote b *applicable only to single joist or rafter cavity, not scissor trusses*
footnote c *R-21 equivalent may be R-15 interior rigid continuous insulation (ci),OR R-13 batt interior with R-5 rigid continuous insulation (ci).*

☐ U-Factor / Total UA Equivalent compliance (complete sheets 4 and 5 for compliance)

	Openings	U-value		Ceiling Insulation		Walls	Below Grade Walls			
	% floor area	Vertical	Overhead	attic	vaulted	Above Grade	interior	exterior	Floors	Slab on grade
Target Values	15%	0.300	0.50	0.026	0.026	0.056	0.042	0.042	0.029	0.54
Proposed Values										
equivalent R-values:										

WHOLE HOUSE VENTILATION SYSTEMS

Check the "whole house ventilation system" that will be used

- ☐ whole house ventilation using exhaust fans (Form EXHAUST FAN) IRC M1507.3.4
- ☐ whole house ventilation integrated with a forced-air system (Form INTEGRATED) IRC M1507.3.5
- ☐ whole house ventilation using a supply fan (Form SUPPLY FAN) IRC M1507.3.6
- ☐ whole house ventilation using a heat recovery ventilation system (Form HEAT RECOVERY) IRC M1507.3.7
- ☐ Engineered "whole house ventilation system" designed in compliance with IMC Section 403.8.10

LOCATION OF WHOLE HOUSE FAN _____ **SIZE:** _____ **cfm**

☐ *check box if* fan is connected to 24-hr timer to operate _____ hrs / day (see pg. 3)
(if box not checked, fan specified to run continuously) Fan sone ≤ 1.0 or inline 4 ft from inlet.

AIR LEAKAGE

Components of the building thermal envelope as listed in TABLE R402.4.1.1 shall be installed per manufacturer's specifications to limit air leakage rate to not exceed **5 air changes per hour** (ACH). *Energy Credit Options 2 limits max ACH.*

Blower door test @50 Pa max. rate:(Bldg Vol (ft^3)x 5 ACH) / 60 min.= _____ cfm

Residential Construction Energy Compliance: King County

ENERGY CREDIT OPTION DESCRIPTIONS: *Choose option(s) for total points equal to minimum required for building size:* **Addition < 500 sq.ft. = 0.5 pts.; Addition > 500 sq.ft. and Addition < 1500 sq.ft. = 1.5 pts.; Bldg sq.ft. < 1500 with less than 300 sq.ft. openings = 1.5 pts.; Bldg sq.ft. > 5000= 4.5 pts.; all others = 3.5 pts.**

☐ **1a** (0.5 pt)	**Efficient Building Envelope 1a**: Table R402.1.2 Prescriptive compliance with openings U = 0.28, floor R-38, slabs R-10 perimeter and under entire slab, **OR** Total UA Equivalent compliance Target UA reduced by 5% (0.5 pt)
☐ **1b** (1.0 pt)	**Efficient Building Envelope 1b:** Table R402.1.2 Prescriptive compliance with openings U = 0.25, wall R-21 plus R-4, floor R-38, slabs R-10 perimeter and under entire slab with below grade walls R-21 plus R-5 c.i., **OR** Total UA Equivalent compliance with Target UA reduced by 15%. (1.0 pt)
☐ **1c** (2.0 pts)	**Efficient Building Envelope 1c:** Table R402.1.2 Prescriptive compliance with openings U = 0.22, walls R-21 plus R-12 c.i., floor R-38, slabs R-10 perimeter and under entire slab, and R-49 advanced frame ceilings and vaulted areas, **OR** Total UA Equivalent compliance with Target UA reduced by 30%. (2.0 pts)
☐ **1d** (0.5 pt)	**Efficient Building Envelope 1d:** Table R402.1.2 Prescriptive compliance with openings U = 0.24 (0.5 pt)
☐ **2a** (0.5 pt)	**Air leakage Control and Efficient Ventilation 2a:** Compliance per R402.4.1.2: Envelope leakage reduced to maximum **3.0 ACH**. Whole house ventilation requirements met by ventilation system per IRC M1507.3 with high efficiency fan (maximum 0.35 watts/cfm) not interlocked with furnace ventilation system. (0.5 pt)
☐ **2b** (1.0 pt)	**Air leakage Control and Efficient Ventilation 2b:** Compliance per R402.4.1.2: Envelope leakage reduced to maximum **2.0 ACH**. Whole house ventilation requirements met by **heat recovery system per IRC M1507.3** with minimum sensible heat recovery efficiency of 0.70. (1.0 pt) ***Show heat recovery system on the plans***
☐ **2c** (1.5 pts)	**Air leakage Control and Efficient Ventilation 2c:** Compliance per R402.4.1.2: Envelope leakage reduced to maximum **1.5 ACH**. Whole house ventilation requirements met by **heat recovery system per IRC M1507.3** with minimum sensible heat recovery efficiency of 0.85. (1.5 pts) ***Show heat recovery system on the plans***
☐ **3a** (1.0 pt)	**High Efficiency HVAC Equipment 3a:** Gas, propane, or oil-fired furnace with minimum AFUE of 94% or boiler with minimum AFUE of 92%. **Plans shall specify equipment type, size, and minimum efficiency.** (1.0 pt)
☐ **3b** (1.0 pt)	**High Efficiency HVAC Equipment 3b:** Air-source **heat pump** with minimum HSPF of 9.0. **Plans shall specify heating equipment type, size, and minimum efficiency.** (1.0 pt)
☐ **3c** (1.5 pts)	**High Efficiency HVAC Equipment 3c:** Closed-loop ground source **heat pump** with minmum COP of 3.3 OR open-loop water source heat pump with maximum pumping hydraulic head of 150 ft. and with COP ≥ 3.6. **Plans shall specify heating equipment type, size, and minimum efficiency.** (1.5 pts)
☐ **3d** (1.0 pt)	**High Efficiency HVAC Equipment 3d:** Where primary space heating system is **zonal electric heating**, a **ductless heat pump** system shall be installed to provide heating to the **largest zone.** (1.0 pt)
☐ **4** (1.0 pt)	**High Efficiency HVAC Distribution:** All heating and cooling components installed inside conditioned space. All combustion equipment shall be direct vent or sealed combustion. No system components installed in crawlspace. Duct type and length limitations and insulated to minimum R-8 if located outside conditioned space **No electric resistance heat or ductless heat pumps are permitted.** Direct combustion heating equipment AFUE ≥80%. **Plans shall show equipment type and location of all equipment and type of ductwork.** (1.0 pt)
☐ **5a** (0.5 pt)	**Efficient Water Heating 5a:** All showerheads and kitchen sink faucets shall be rated at 1.75 gpm or less, all others at 1.0 gpm or less when tested in accordance with ASME A112.18.1/CSA B125.1. (0.5 pt)
☐ **5b** (1.0 pt)	**Efficient Water Heating 5b:** Water heating system shall include one of the following: gas, propane or oil water heater with minimum EF of 0.74; **OR** water heater heated by ground source heat pump with minimum COP of 3.3 **OR** open-loop water source heat pump with maximum pumping hydraulic head of 150 ft. and with COP > 3.6. **Plans shall specify heating equipment type, size, and minimum efficiency.** (1.0 pt)
☐ **5c** (1.5 pts)	**Efficient Water Heating 5b:** Water heating system shall include one of the following: gas, propane or oil water heater with minimum EF of 0.91; **OR** Electric heat pump water heater with EF ≥ 2.0 per NEEA's Northern Climate specifications for Heat Pump Water Heaters; **OR** solar water heating supplementing standard water heater. Solar water heating will provide rated minimum savings of 85 therms or 2000 kWh based on Solar Rating and Certification Corp (SRCC) Annual Performance of OG-300 Certified Solar Water Heating Systems(provide savings calculations); **Plans shall specify water heating equipment type, size, and minimum efficiency.**

Residential Construction Energy Compliance: King County

ENERGY CREDIT OPTION DESCRIPTIONS (continued)

☐ **5d** (0.5 pt)	**Efficient Water Heating 5d:** Drain water heat recovery unit(s) installed on all shower waste water drains with minimum efficiency ≥ 40% if installed for equal flow, **OR** minimim efficiency ≥ 52% if installed for unequal flow. Rated per CSA B55.1 standard and so labeled. **Must submit Plumbing diagram** that specify water heat recovery units, and plumbing layout needed to install **with documentation for compliance to standard.** (0.5 pt)	
☐ **6** (0.5 - 3 pts)	**Renewable Electric Energy:** for each 1200 kWh of electrical generation per housing unit provided annually by on-site wind or solar equipment allows 0.5 pt credit up to 3 pts credits. Generation shall be calculated as follows:	
	=	**Solar electric systems**: design shall be demonstrated to meet requirement using the National Renewable Energy laboratory calculator PVWATTs. Solar access documentation to be included.
	=	**Wind generation projects**: design shall document annual power generation based on the following factors: wind turbine power curve, average annual wind speed at the site, frequency distribution of the wind speed at the site and the height of the tower.

Must specify on the building plans the option being selected, and shall show the photovoltaic or wind turbine equipment type, provide documentation of solar or wind access, and include a calculation of the minimum annual energy power production.

VENTILATION AND INDOOR AIR QUALITY REQUIREMENTS

Whole House Ventilation fan(s) shall be sized according to International Residential Code section M1507.3.3.

* Continuously operating exhaust ventilation systems shall provide minimum flows per Table M1507.3.3(1).
* Intermittently operating ventilation systems shall have the minimum flows from Table M1507.3.3(1) adjusted by the ventilation rate multiplier value in Table M1507.3.3(2) according to the formula $Q_f = Q_r \times E_f$

2015 International Residential Code Table M1507.3.3(1) (continuously operating systems)

MINIMUM VENTILATION RATES FOR DWELLINGS FOUR STORIES OR LESS, Q_r

	Number of Bedrooms								
Floor Area (sq.ft.)	0	1	2	3	4	5	6	7	>7
0 1500	30	30	45	45	60	60	75	75	90
1501 to 3000	45	45	60	60	75	75	90	90	105
3001 to 4500	60	60	75	75	90	90	105	105	120
4501 to 6000	75	75	90	90	105	105	120	120	135
6001 to 7500	90	90	105	105	120	120	135	135	150
> 7501	105	105	120	120	135	135	150	150	165

2015 International Residential Code Table M1507.3.3(2)

enter "x" for time ON	INTERMITTENT WHOLE-HOUSE VENTILATION RATE FACTORS (E_f)			Specified Fan
	Run-time % in each 4-hour segment	Rate Multiplier Factor	Min. Fan Size cfm	cfm
☐	25% (1 hr every 4 hrs; 6 hrs / day)	4		
☐	33% (1 hr 20 min every 4 hrs; 8 hrs / day)	3		
☐	50% (2 hrs every 4 hrs; 12 hrs / day)	2		
☐	66% (2 hrs 40 min every 4 hrs; 16 hrs / day)	1.5		
☐	75% (3 hrs every 4 hrs; 18 hrs / day)	1.3		
☐	100% (continuously operating)	1.0		

Whole house exhaust fan shall have a maximum sone rating of 1.0, or install in-line duct fan located a minimum 48 inches from intake grille opening

Residential Construction Energy Compliance: King County

OPENINGS: Door and Glazing Summary

	size (WxH)	Area (sq.ft.)	U-Value	UA-value
Entry door				
other doors				
other doors				
other doors				
TOTALS:				
Skylights				

	Quantity	Area (sq.ft.)	U-Value	UA-value
Basement windows				
1st floor windows				
2nd floor windows				
3rd floor windows				
TOTALS:				
% openings = Area / floor area			%	

Complete Opening Schedule if using weighted average U-value for openings Or UA-equivalent Compliance.

Door and Glazing Opening Schedule

Location or Type of opening	Opening size		Indiv Area (sq.ft.)	U-Value	Qty.	Combined Area	UA value
	width	height					

Provide separate sheet(s) if necessary

	Qty.	Combined Area	UA value
total quantity, area, and UA values from additional sheets =			
TOTALS			
Average: UA / A = U-Value =			

% Total Glazing = Glazing Area / Floor Area = ________ = ________ %

Residential Construction Energy Compliance: King County

Building heat loss calculations / U-Factor Equivalent compliance

Use common U-Values from Appendix A in WAC chapter 51-11C (listed on pg 7) or ASHRAE *Handbook of Fundamentals*

	Framing type? Adv / Std / Int	Insulation value*	average U-Value*	PROPOSED Area	PROPOSED UA		CODE ALLOWABLE U-Value	CODE ALLOWABLE Area	CODE ALLOWABLE UA
Attic Area							0.027		
Vaulted Ceiling						Opening area based on 15% floor area ==>	0.027		
Glazing Area							0.300		
Skylights						use actual area	0.500		
Door Area						Gross wall area minus opening areas ==>	*Doors included in 15% opening area*		
Above Grade Walls **Net** Area							0.056		
Floor Area over unheated area							0.029		
Slab on-Grade (length)				ft.			0.540	ft.	
Below Grade Walls (0-2 ft)							0.045		
Slab 2-3.5 ft length	f value=			ft.			0.610	ft.	
Below Grade Walls (2-3.5 ft)							0.042		
Slab 3.5-7 ft length	f value=			ft.			0.570	ft.	
Below Grade Walls (3.5-7 ft)							0.038		
Slab >7 ft length	f value=			ft.			0.430	ft.	
Below Grade Walls (>7 ft)							0.038		
Mulltiple slab / below grade walls									
			Total				Total		

*(provide additional sheets to document calculation of average U-value if multiple framing configurations)

NOTE : Energy Credit 1a, 1b, 1c require adjustment to Code Allowable UA value:

- ☐ *option 1a: reduce 5%*
- ☐ *option 1b: reduce 15%*
- ☐ *option 1c: reduce 30%*

Residential Heating System Sizing Estimation

Heating and cooling systems for residential projects shall be sized in accordance with ACCA Manual S or equiv.

Indoor Design Temperature: 70 City:

Outdoor Design Temp (Township and Range):

(recommended outdoor design temperatures shown on next page)

Design Temperature Difference =

(Indoor - Outdoor Design Temp)

(May use 48 as default Design Temperature Difference)

Total Conditioned Area (ft^2) = Average floor height = ft.

Conditioned Volume (floor area X average floor height) = (CV)

Sum of UA (heat loss of bldg) (UA)

	other fuels		electric	
Envelope Heat Load				
Sum of UA X Design Temperature Difference =		Btu / Hour		KW
Air Leakage Heat Load	***Convert Btu / hr to electric KW: Btu/h ÷ 3413***			
CV X 0.6 X Design Temperature Difference X .018 =		Btu / Hour		KW
Building Design Heat Load				
Air Leakage + Envelope Heat Load =		Btu / Hour		KW
Building and Duct Heat Load				
Building Design Heat Load x 1.1 or 1.0 ( )=		Btu / Hour		KW

Use 1.1 if ducts are located in unconditioned space: Building Design Heat Load X 1.1

Use 1.0 if ducts are located in conditioned space: Building Design Heat Load X 1.0

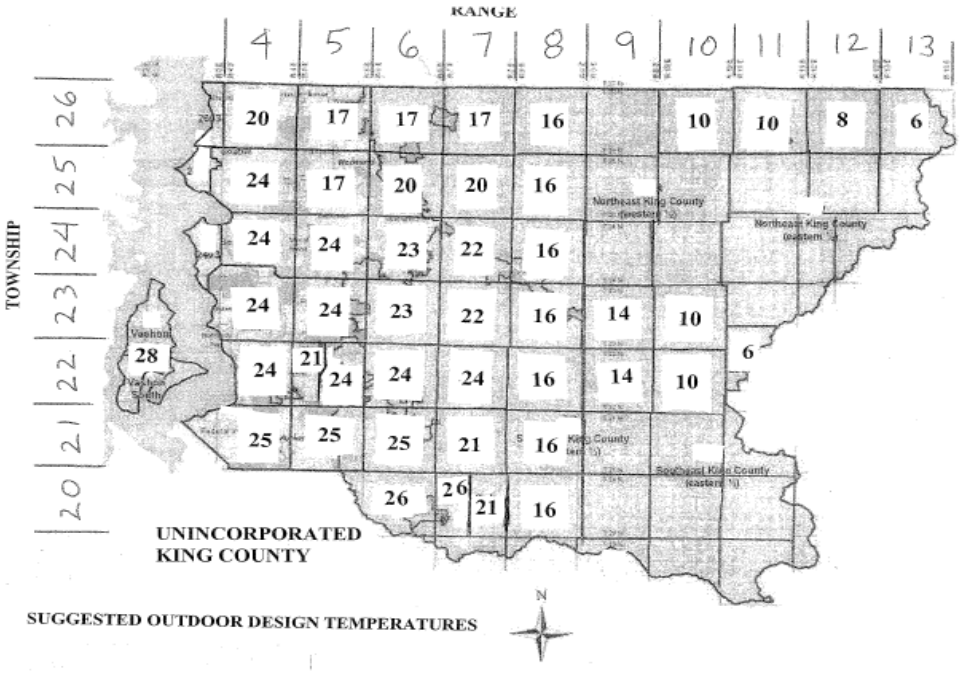
Maximum Heating Equipment Output

Use Building and Duct Heat Load X 1.40 for Forced Air Furnace =		Btu / Hour		KW
Use Building and Duct Heat Load X 1.25 for Heat Pump system =				

Actual heat sizing calculation to be supplied by mechanical contractor at time of equipment installation.

Residential Construction Energy Compliance: King County

Recommended Outdoor Design Temperatures



Building heat loss calculations based on new and existing construction

Use common U-values from Appendix A WAC chapter 51-11C or ASHRAE *Handbook of Fundamentals*

	Framing type? Std / Int / Adv	Insulation value	average U-Value	assembly U-value	Area		UA
Attic Area						=	
Existing Attic Area						=	
Vaulted Ceiling						=	
Existing Vaulted Ceiling						=	
Glazing Area						=	
ExistingGlazing Area						=	
Skylights						=	
Existing Skylights						=	
Door Area						=	
Existing Door Area						=	
Net Above Grade Walls						=	
Net Existing Walls						=	
Floor Area over unheated						=	
Existing Floor over unheated						=	
Slab on-Grade (length)						ft. =	
Below Grade Walls (0-2 ft)						=	
Below grade slab 2-3.5 ft length		f value=				ft. =	
Below Grade Walls (2-3.5 ft)						=	
Below grade slab 3.5-7 ft length		f value=				ft. =	
Below Grade Walls (3.5-7 ft)						=	
Below grade slab >7 ft length		f value=				ft. =	
Below Grade Walls (>7 ft)						=	
Mulltiple slab / below grade walls, provide summary of calcs						=	
					Proposed Total =		

Residential Construction Energy Compliance: King County

Common U-Values for various framed elements

CEILINGS

TYPE	Insulation	FRAMING Standard	Intermed.	Advanced
Flat	R-19	0.049		0.047
	R-30	0.036		0.032
	R-38	0.031		0.026
	R-49	0.027		0.020
	R-60	0.025		0.017
Scissor truss				
4:12 pitch	R-30	0.043		0.031
4:12 pitch	R-38	0.040		0.025
4:12 pitch	R-49	0.030		0.020
5:12 pitch	R-30	0.039		0.032
5:12 pitch	R-38	0.035		0.026
5:12 pitch	R-49	0.032		0.020
Vaulted		16" OC	24" OC	
vented 2x10	R-19	0.049	0.048	
vented 2x12	R-30	0.034	0.033	
vented 2x14	R-38	0.027	0.027	
unvented 2x10	R-30	0.034	0.033	
unvented 2x12	R-38	0.029	0.027	

FLOORS

Insulation	Post & Beam	Joists
R-0	0.112	0.134
R-11	0.052	0.056
R-19	0.038	0.041
R-22	0.034	0.037
R-25	0.032	0.034
R-30	0.028	0.029
R-38	0.024	0.025

SLAB on GRADE

UNHEATED SLAB		UNHEATED SLAB	
uninsulated	0.73	R-10 fully insulated	0.36
all 2 ft horiz w/o tb*	0.70	R-15 fully insulated	0.31
R-5 2-ft vert/horiz	0.58	R-20 fully insulated	0.26
R-10 2-ft vert/horiz	0.54	HEATED SLAB	
R-15 2-ft vert/horiz	0.52	R0 uninsulated	0.84
R-5 4-ft vert/horiz	0.54	R5 fully insulated	0.74
R-10 4-ft vert/horiz	0.48	R10 fully insulated	0.55
R-15 4-ft vert/horiz	0.45	R15 fully insulated	0.44
		R20 fully insulated	0.39
		R30 fully insulated	0.32

WALLS

	Insulation	FRAMING Standard	Intermed.	Advanced
Lapped Wood Siding				
2 x 4 WOOD	R-11	0.088		0.084
	R-13	0.082		0.078
	R-15	0.076		0.071
2 x 6 WOOD	R-19	0.062	0.058	0.055
	R-21	0.057	0.054	0.051
	R-22	0.059	0.055	0.052
	(2) R-11	0.060	0.057	0.054
2 x 8 WOOD	R-25	0.051	0.047	0.045
		FRAMING		
T1-11 Siding		Standard	Intermed.	Advanced
2 x 4 WOOD	R-11	0.094		0.09
	R-13	0.088		0.083
	R-15	0.081		0.075
2 x 6 WOOD	R-19	0.065	0.061	0.058
	R-21	0.06	0.056	0.053
	R-22	0.062	0.058	0.054
	(2) R-11	0.063	0.059	0.056
2 x 8 WOOD	R-25	0.053	0.049	0.046

BELOW GRADE WALLS

	depth	U-value	Slab F-factor
2 ft below grade	uninsulated	0.350	0.59
	R-11 interior	0.066	0.68
	R-11 interior w/tb*	0.070	0.60
	R-19 interior	0.043	0.69
	R-19 interior w/tb*	0.045	0.61
	R-10 exterior	0.070	0.60
	R-12 exterior	0.061	0.60
3.5 ft below grade	uninsulated	0.278	0.53
	R-11 interior	0.062	0.63
	R-11 interior w/tb*	0.064	0.57
	R-19 interior	0.041	0.64
	R-19 interior w/tb*	0.042	0.57
	R-10 exterior	0.064	0.57
	R-12 exterior	0.057	0.57
7 ft below grade	uninsulated	0.193	0.46
	R-11 interior	0.054	0.56
	R-11 interior w/tb*	0.056	0.42
	R-19 interior	0.037	0.57
	R-19 interior w/tb*	0.038	0.43
	R-10 exterior	0.056	0.42
	R-12 exterior	0.050	0.42

** w/tb = with thermal break*

METAL STUDS

		16" OC	24" OC
4-inch	R-11	0.132	0.116
4-inch	R-13	0.124	0.108
4-inch	R-15	0.118	0.102
6-inch	R-19	0.109	0.094
6-inch	R-21	0.106	0.090
8-inch	R-25	0.08	0.091

LOG WALLS

R-1.25/ inch

(average	6"	0.148
log	8"	0.111
diameter)	10"	0.089
	12"	0.074
	14"	0.063
	16"	0.056

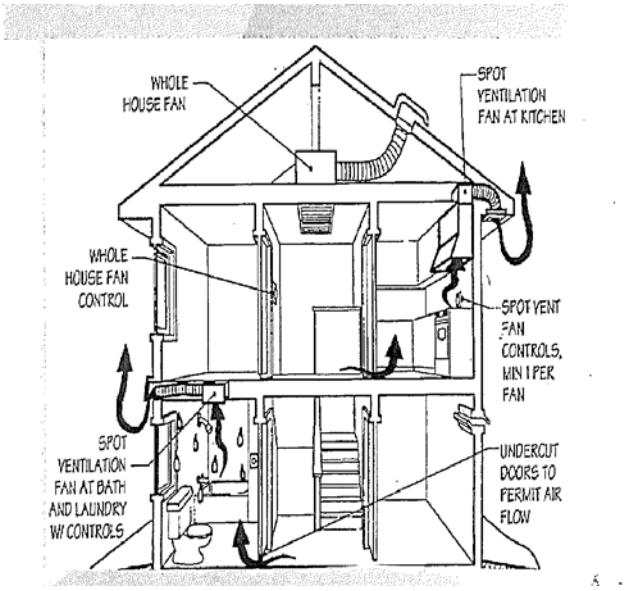
Residential Construction Energy Compliance: King County

AIR BARRIER AND INSULATION INSTALLATION TABLE R402.4.1.1

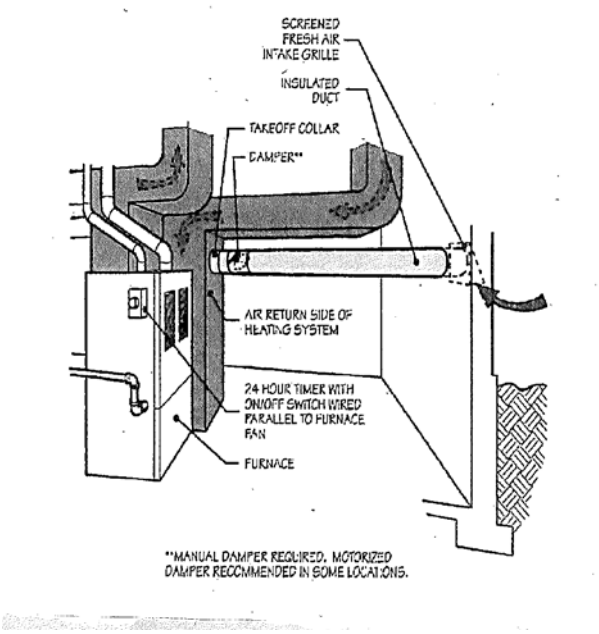
COMPONENT	AIR BARRIER CRITERIA[a]	INSULATION CRITERIA[a]
Air barrier and thermal barrier	A continuous air barrier shall be installed in the building envelope. Exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed.	Air-permeable insulation shall not be used as a sealing material. Class I or II vapor retarders are required on the interior side of framed cavities.
Cavity insulation installation	All cavities in the thermal envelope shall be filled with insulation. The density of the insulation shall be at the manufacturers' product recommendation and said density shall be maintained for all volume of each cavity. Batt type insulation will show no voids or gaps and maintain an even density for the entire cavity. Batt insulation shall be installed in the recommended cavity depth. Where an obstruction in the cavity due to services, blocking, bracing or other obstruction exists, the batt product will be cut to fit the remaining depth of the cavity. Where the batt is cut around obstructions, loose fill insulation shall be placed to fill any surface or concealed voids, and at the manufacturers' specified density. Where faced batt is used, the installation tabs must be stapled to the face of the stud. There shall be no compression to the batt at the edges of the cavity due to inset stapling installation tabs. Insulation that upon installation readily conforms to available space shall be installed filling the entire cavity and within the manufacturers' density recommendation.	
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier sealed. Access openings, drop down stair or knee wall doors to unconditioned attic spaces shall be sealed.	Batt insulation installed in attic roof assemblies may be compressed at exterior wall lines to allow for required attic ventilation. The insulation in any dropped ceiling or soffit shall be aligned with the air barrier.
Walls	The junction of the foundation and sill plate shall be sealed. The junction of the top plate and top of exterior walls shall be sealed. Knee walls shall be sealed.	Cavities within corners and headers shall be insulated by completely filling the cavity with a material having a minimum thermal resistance of R-3 per inch. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.
Windows, skylights and doors	Space between window/door jambs and framing and skylights and framing shall be sealed.	
Rim joists	Rim joists shall include the air barrier.	Rim joists shall be insulated
Floors (including above-garage and cantilevered)	The air barrier shall be installed at any exposed edge of insulation.	Installed to maintain permanent contact with underside of subfloor decking or permitted to be in contact with the topside of sheathing or continuous insulation installed on the underside of floor framing and extend from the bottom to the top of all perimeter floor framing.
Crawl space walls	Soil in unvented crawl spaces shall be covered with Class I, black vapor retarder with joints taped.	Where provided in lieu of floor insulation, insulation shall be permanently attached to the crawlspace walls.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.	
Narrow cavities		Batts in narrow cavities shall be cut to fit and installed to the correct density without any voids or gaps or compression. Narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.	
Recessed lighting	Shall be sealed to the drywall.	Shall be air tight, and IC rated.
Plumbing and wiring		Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls. There shall be no voids or gaps or compression where cut to fit. Insulation that readily conforms to available space shall extend behind piping and wiring.
Shower and/or tub	Installed at exterior walls adjacent to showers and tubs shall separate them from showers and tubs.	Exterior walls adjacent to showers or tubs shall be insulated
Electrical/phone box	Barrier shall be installed behind electrical or communication boxes on exterior wall or install air sealed boxes.	
HVAC register boots	Boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall.	
Concealed Sprinklers	When required to be sealed, fire sprinklers shall only be sealed in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.	

footnote a *In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.*

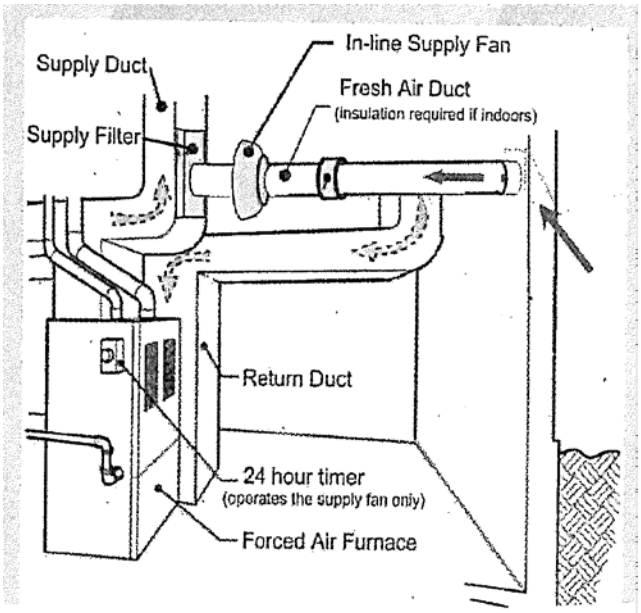
Residential Construction Energy Compliance: King County



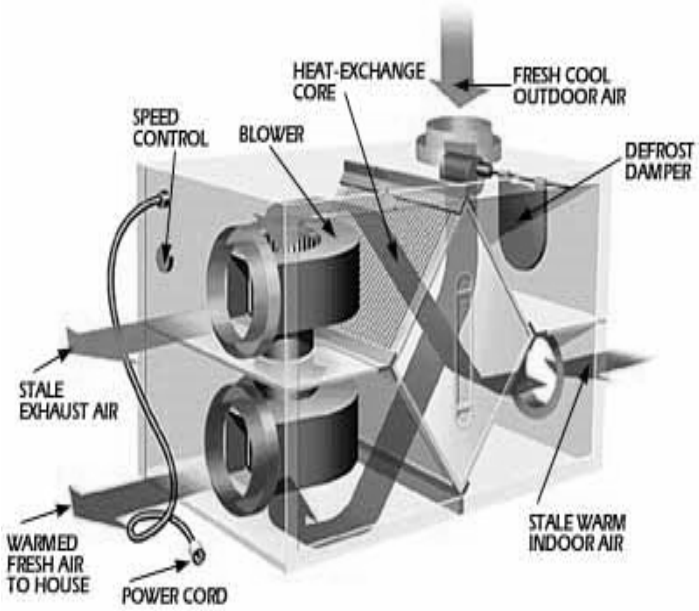
M1507.3.4 VENTILATION SYSTEM USING EXHAUST FAN(S)



M1507.3.5 VENTILATION SYSTEM USING INTEGRATED SYSTEM



M1507.3.6 VENTILATION SYSTEM USING SUPPLY FAN



M1507.3.7 VENTILATION SYSTEM USING HEAT RECOVERY SYSTEM

Residential Construction Energy Compliance: King County

Supplemental
Door and Glazing Opening Schedule

Location or Type of opening	Opening size		Indiv Area (sq.ft.)	U-Value	Qty.	Combined Area	UA value
	width	height					
SUB-TOTAL							

Energy Code Support

WASHINGTON STATE UNIVERSITY EXTENSION ENERGY PROGRAM

Duct Leakage Affidavit (New Construction)

Permit #: _____

House address or lot number: _____

City: _____ Zip: _____

Cond. Floor Area (ft^2): _____ Source (circle one): Plans Estimated Measured

☐ Duct tightness testing is not required. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope. Ducts located in crawl spaces do not qualify for this exception.

Air Handler in conditioned space? ☐ yes ☐ no Air Handler present during test? ☐ yes ☐ no

Circle Test Method: Leakage to Outside Total Leakage

Maximum duct leakage:

Post Construction, total duct leakage: (floor area x .04) = _____CFM@25 Pa

Post Construction, leakage to outdoors: (floor area x .04) = _____CFM@25 Pa

Rough-In, total duct leakage with air handler installed: (floor area x .04) = _____CFM@25 Pa

Rough-In, total duct leakage with air handler not installed: (floor area x .03) = _____CFM@25 Pa

Test Result: _____CFM@25Pa

Ring (circle one if applicable): Open 1 2 3

Duct Tester Location: _____ Pressure Tap Location: _____

I certify that these duct leakage rates are accurate and determined using standard duct testing protocol.

Company Name: _____ Technician: _____

Technician Signature: _____

Date: _____

Phone Number: _____

Energy Code Support

WASHINGTON STATE UNIVERSITY EXTENSION ENERGY PROGRAM

Duct Leakage Test Results (Existing Construction)

Permit #: _____

House address or lot number: _____

City: _____ Zip: _____

Cond. Floor Area (ft^2): _____

☐ Duct tightness testing is not required for this residence per exceptions listed at the end of this document

Test Result: _____CFM@25Pa

Ring (circle one): Open 1 2 3

Duct Tester Location: _____

Pressure Tap Location: _____

I certify that these duct leakage rates are accurate and determined using standard duct testing protocol

Company Name: _____

Duct Testing Technician: _____

Technician Signature: _____ Date: _____

Phone Number: _____

Washington State Energy Code Reference:

R101.4.3.1 Mechanical Systems: When a space-conditioning system is altered by the installation or replacement of space-conditioning equipment (including replacement of the air handler, outdoor condensing unit of a split system air conditioner or heat pump, cooling or heating coil, or the furnace heat exchanger), the duct system that is connected to the new or replacement space-conditioning equipment shall be tested as specified in RS-33. The test results shall be provided to the building official and the homeowner.

Exceptions:

1. Duct systems that are documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in RS-33.
2. Ducts with less than 40 linear feet in unconditioned spaces.
3. Existing duct systems constructed, insulated or sealed with asbestos.
4. Additions of less than 750 square feet.

Residential Construction Energy Compliance: King County

Typical Energy Option Credit Scenerios for 3.5 points

Scenerio	option	description	points	
case 1:	**3a or 3b**	Gas furnace with AFUE ≥0.94, **OR** 9.0 HSPF Heat pump	**1.0**	
	4	All ducts and furnace located in conditioned space	**1.0**	
	5a	kitchen sink and showerheads ≤ 1.75 gpm, lavatory faucets ≤ 1 gpm	**0.5**	
	5b	Gas water heater EF ≥ 0.74	**1.0**	total = 3.5
case 2:	**1a**	R-38 floor insulation, and openings U ≤ 0.28	**0.5**	
	3a or 3b	Gas furnace with AFUE ≥0.94, **OR** 9.0 HSPF Heat pump	**1.0**	
	5a	kitchen sink and showerheads ≤ 1.75 gpm, lavatory faucets ≤ 1 gpm	**0.5**	
	5c	Gas water heater EF ≥ 0.91 **OR** Electric water heater EF ≥ 2.0	**1.5**	total = 3.5
case 3:	**1a**	R-38 floor insulation, and openings U ≤ 0.28	**0.5**	
	2a	Air leakage ≤ 3.0 ACH @ 50 pa.	**0.5**	
	3a or 3b	Gas furnace with AFUE ≥0.94, **OR** 9.0 HSPF Heat pump	**1.0**	
	5a	kitchen sink and showerheads ≤ 1.75 gpm, lavatory faucets ≤ 1 gpm	**0.5**	
	5b	Gas water heater EF ≥ 0.74	**1.0**	total = 3.5
case 4:	**2a**	Air leakage ≤ 3.0 ACH @ 50 pa.	**0.5**	
	3a or 3b	Gas furnace with AFUE ≥0.94, **OR** 9.0 HSPF Heat pump	**1.0**	
	5a	kitchen sink and showerheads ≤ 1.75 gpm, lavatory faucets ≤ 1 gpm	**0.5**	
	5c	Gas water heater EF ≥ 0.91 **OR** Electric water heater EF ≥ 2.0	**1.5**	total = 3.5
case 5: All Electric	**1a**	R-38 floor insulation, and openings U ≤ 0.28	**0.5**	
	3d	Ductless Heat Pump	**1.0**	
	5a	kitchen sink and showerheads ≤ 1.75 gpm, lavatory faucets ≤ 1 gpm	**0.5**	
	5c	Electric water heater EF ≥ 2.0	**1.5**	total = 3.5